

USER PREFERENCE INFORMATION STRUCTURE HAVING MULTIPLE HIERARCHICAL STRUCTURE AND METHOD FOR PROVIDING MULTIMEDIA INFORMATION USING THE SAME

5 BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a user preference information structure having a multiple hierarchical structure and a method for providing multimedia
10 information using the same which are capable of quickly and easily recommending and providing information desired by information user in a multimedia service system environment consisting of an information provider and an information user.

2. Description of the Background Art

15 In a multimedia service system environment consisting of an information provider and an information user, the information user can hardly absorb explosively increasing amount of information. The same phenomenon also occurs in the Internet environment that offers huge amount of information as well as in a television broadcast environment that offers entertainment and life information.

20 Besides, as communication techniques are progressively developed, new providers such as a cable TV appear to provide diverse information.

However, notably, as information providers increase in number more and more, information users find it difficult to quickly and accurately search desired information provided by the information providers.

25 Accordingly, in order to provide the information users quickly and easily

with desired information by the information providers, researches have been conducted and methods have been sought and developed that programs or information preferred by information users (briefly referred to as 'users', hereinafter) are recommended or automatically selected on the basis of a user preference value for information desired by users.

In the methods for providing information in accordance with conventional arts, user preference information by items of information desired by users is constructed on the basis of a use record (that is, a user profile) that has been used by a user by direct selection, so as to be provided to users.

However, the information providing methods of the conventional arts are not able to adequately cope with situations that user preference values are differently set for the same information according to user's wish and that relationships between items of information are complicate and a user preference value for a single item has a different meaning according to an environment and a relationship with a different item or may be changed to a different user preference value.

For example, a user 'A', who likes a movie in which an actor 'B' played a role (a person>an actor>'B'), may dislike a movie directed by the actor 'B' (a person>a director>'B'). Besides, though a user preference value of an upper item is low, a user preference value of a lower item is high, or otherwise, a user preference value of the upper item may be high while a user preference value of the lower item is low. For these situations, the information providing methods of the conventional arts fail to provide proper information adaptively.

As a different example, the user 'A' may want a movie with lots of violence scenes as he or she prefers a movie of violence, but, he may not want violence

scenes with a news program or educational information that he or she watches on TV with children, sitting in front of a television set. In this case, the information providing methods of the conventional arts fails to provide proper information according to situations in which in case that an upper item is set as a movie for a violence scene, its user preference value becomes high, while in case that an upper item is set as a news program or an educational stuff, the user preference value becomes low.

Meanwhile, a user preference value on information can be different depending on situations that the user is put, with which the information providing methods of the conventional arts can hardly cope.

For example, the user may prefer a melodrama or a family movie in a rainy day, or he or she may prefer an action movie in a sunny day. That is, for the same movie item, user preference is different according to situations in which the user is put. The information providing methods of the conventional arts do not properly cope with it.

In addition, the user preference may be different depending on a receiving device used by the user, with which the information providing methods of the conventional arts can hardly cope.

For example, in case that the user watches a movie on a TV with his or her family in a living room, the user may prefer a family-rated movie, while in case that the user watches a movie on a TV in his or her own room, he or she may prefer a movie that is not allowed for minors. The information providing methods of the conventional arts do not properly cope with it.

Figure 1 illustrates user preference values of each item of information in accordance with a conventional art, in which user preference items (i.e.,

entertainment, music and pop music, etc) are allocated with specific item identifiers (1, 17, 181,...) and correspondingly independent user preference values (86, 43, 27,...).

Accordingly, relationships between each item is not expressed and the user preference value of each item is constantly maintained even if an environment is changed, so that no proper information can be provided for a situation in which the user is put.

In addition, in order to update user preference information, each corresponding item should be included in the use information. That is, in case that classified information only includes a name of a singer 'C' and a genre of a 'new age', not including 'entertainment' or 'music', only the 'C' item' and the 'new age' item are updated, while the user preference value for the relevant upper item such as 'entertainment, 'music', 'pop music', 'person' and 'woman singer' is not updated.

SUMMARY OF THE INVENTION

Therefore, an object of the present invention is to provide a data structure having a multiple hierarchical structure and an information providing method fitting a user preference by using the data structure, to provide information desired by an information user.

Another object of the present invention is to provide a method for editing a data structure having a multiple hierarchical structure, to provide information desired by an information user.

Still another object of the present invention is to provide a method for providing information by users and by preferences, in which various independent

individual user preference information structures are defined and each user preference item and user preference/non-preference included in the individual user preference information structure defines a relationship in a hierarchical structure, whereby user preference/non-preference are defined from specific items to general items, and an adoption condition of each individual user preference information structure is defined, so that detailed information can be recommended, provided or limited according to a user preference that may be different depending on situations and information fitting situations can be recommended, provided or limited.

To achieve these and other advantages and in accordance with the purpose of the present invention, as embodied and broadly described herein, there is provided a user preference information structure having a multiple hierarchical structure in which an information is provided to a user according to a user preference in a multi-media environment consisting of an information provider and an information user, including user use information by using information desired by the user; user preference information of information desired by the user; and individual user preference information that is differently set depending on situations in which the user is put and positioned in a sub-tree of the user preference information.

To achieve the above objects, there is also provided a method for providing multi-media information by using a multiple hierarchical structure in which information is provided to a user according to a user preference in an environment consisting of an information provider and an information user, including the steps of: establishing a multiple hierarchical structure having individual user preference information by users and by search items for user

preference information of searching items of the user; searching user preference item information having user preference/non-preference by users and searching items; and providing searched information according to preference of the user.

To achieve the above objects, there is also provided a method for editing a multiple hierarchical data structure in which information is provided to a user according to a user preference in an environment consisting of an information provider and an information user, including the steps of: establishing a multiple hierarchical structure having individual user preference information by users and by search items for user preference information of searching items of the user; and changing a user preference information structure in case that a hierarchical structure between items is changed.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this specification, illustrate embodiments of the invention and together with the description serve to explain the principles of the invention.

In the drawings:

Figure 1 illustrates a user preference structure by items of information in accordance with a conventional art;

Figure 2 is a schematic view showing a multiple hierarchical data structure in accordance with the present invention;

Figure 3 shows a multiple structure of user preference items of individual user preference information structures of Figure 2 in accordance with the present

invention;

Figure 4 is a detailed view showing a hierarchical structure of user preference items of Figure 2 in accordance with the present invention;

Figure 5 illustrates a hierarchical structure of an individual user preference information which varies depending on the client device used by a user in accordance with the present invention;

Figure 6 is a table showing the hierarchical structure of Figure 2 by using a self-identifier of a user preference item and an identifier of an higher level user preference item in the hierarchical structure in accordance with the present invention;

Figure 7 is a table showing the hierarchical structure of Figure 2 by using a coding scheme of the item identifier of Figure 6 in accordance with the present invention;

Figure 8 is a table showing the hierarchical structure of Figure 2 by using the individual user preference information of the leaf nodes of the hierarchical tree structure in accordance with the present invention;

Figure 9 is a table showing a hierarchical structure of Figure 1 by using an item dictionary of Figure 10 in accordance with the present invention;

Figure 10 is a table showing dictionary items for the user preference items in accordance with the present invention;

Figure 11A illustrates a schema showing the hierarchical data structure before it is edited in accordance with the present invention;

Figure 11B illustrates a schema showing the hierarchical data structure after it is edited in accordance with the present invention;

Figure 12A is a table showing an item dictionary before it is changed in

accordance with the present invention; and

Figure 12B is a table showing an item dictionary after it is changed in accordance with the present invention.

5 DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Reference will now be made in detail to the preferred embodiments of the present invention, examples of which are illustrated in the accompanying drawings.

Figure 2 is a schematic view showing a multiple hierarchical data structure
10 in accordance with the present invention.

As shown in the drawing, user information 100 for a single user or single group of users contains personal information 110, a plurality (0, 1, ..., n) of usage history 120, user preference information 130 and a plurality of user authorization information 140.

15 The user preference information 130 contains a plurality (1, 2, ..., n) of individual user preference information 130(1) and the individual user preference information 130(1) contains a user preference item 130(1)-1 and user preference/non-preference 130(1)-2 and a description 130(1)-3.

The personal information 110 may includes a name, a sex, an age and
20 date and year of birth of a user in addition to a user ID.

The usage history 120 includes information on when (year, month, data, time), where (a client system ID, or location), how (information as to when an action such as play, review, pause, fast forward or stop happens) and what information (an information ID) has been used.

25 As the usage history can be classified by history collection condition such

as when the history is collected, the plurality of the usage history is allowed.

The user authorization information 140 indicates information which is allowed to access for the user. For example, it includes information on channels that are requested and not requested to view a TV broadcasting or information on
5 a basic channel and a charged channel.

The user preference information 130 may include a plurality of individual user preference information 130(1), 130(2), ..., 130(n).

Each individual user preference information 130(1) may include a single user preference item 130(1)-1, a user preference/non-preference 130(1)-2, and a
10 single description 130(1)-3, if any.

In case where the plurality of individual user preference information 130(1), 130(2), ..., 130(n) need to be identified, the description 130(1)-3 describes application conditions of each user preference information 130 contained in the user preference information 130. When a multiple user preference information is
15 constructed by using the description 130(1)-3, the user selects desired individual user preference information to use, or the desired individual user preference information can be selected automatically, based on the description.

In this regard, since each individual user preference information may include a plurality of individual user preference information, a hierarchical tree
20 structure is formed between the user preference items and each user preference item has a user preference/non-preference value. The user preference/non-preference value may be expressed by values representing steps between 1 (the maximum non-preference) and 10 (the maximum user preference) or may be expressed by a binary value. The user preference/non-preference value may be
25 expressed by a value that accumulates the number of use of information

corresponding to each item.

Figure 3 shows a multiple structure of user preference items of individual user preference information structure of Figure 2 in accordance with the present invention, in which the user preference items are arranged by multi-stage relying
5 on an environment or a condition of a system used by a user.

For example, a user preference of information in use at home (that is, an individual user preference information 130(m)), a user preference in use at a work place (that is, an individual user preference information 130(k)) and a user preference value of information in use at a different condition may be differently
10 set. In addition, as shown in Figure 3, under the individual user preference information 130(m), user preference items (1-1, 1-2, 1-3,...) may be arranged, and under the user preference items (1-1, 1-2, 1-3,...), another user preference items (2-1, 2-2, 2-3, ...) may be arranged.

Figure 4 is a detailed view showing a hierarchical structure of user
15 preference items of Figure 2 in accordance with the present invention.

An entertainment item 130(1)-11 is classified into items of music 130(1)-111, movie 130(1)-112, drama, a game show, a talk show, sports, a variety show and a concert.

The music item 130(1)-111 is classified into items of classic 130(1)-1111
20 and pop music 130(1)-1112.

The movie item 130(1)-112 can be classified into items of an action 130(1)-1121, an adventure 130(1)-1122, a comedy 130(1)-1123, a horror 130(1)-1124, a documentary, a drama, a scientific fiction, children.

The pop music 130(1)-1112 can be classified into items of rock music,
25 ballad, heavy metal, dance music, new age, rhythm & blues, jazz, trot, country

western.

Like the classification of the entertainment item 130(1)-11, a news item 130(1)-12 can be classified into items of politics 130(1)-121 and sports 130(1)-122, etc.

5 Figure 5 illustrates a hierarchical structure of a user preference according to an instrument used by a user in accordance with the present invention.

As shown in the drawing, in an apparatus for providing only movie or for providing only music, an overall structure 200 can be divided into sub-structures (200-1, 200-2 and 200-3), based on which each individual user preference
10 information (item 1-1, item 1-2, item 1-3) are set and managed.

In this respect, the individual user preference information (item 1-1, item 1-2, item 1-3) can be classified and managed by using a description.

Figures 6 through 10 illustrate tables showing individual user preference information of Figure 2. The hierarchical structure of Figure 2 can be expressed in
15 several ways.

Figure 6 is a table showing the hierarchical structure of Figure 2 by using a self-identifier of a user preference item and an upper item identifier of an upper user preference item in accordance with the present invention;

The method as shown in Figure 6 has an advantage that a hierarchical
20 structure can be expressed in a predetermined format regardless of its stages.

Figure 7 is a table showing the hierarchical structure of Figure 2 by using a coding scheme of the item identifier of Figure 6 in accordance with the present invention.

The method as shown in Figure 7 is effective when the highest stage
25 number is predetermined in a multi-stage hierarchical structure. Especially, in this

method, time to access the upper items and the lower items is taken short and a relatively less storing space is required.

The item identifier can be divided into fields as many as the number of stages (i.e., 4 stages) having a certain bit and/or byte (i.e., 2 byte), and each field
5 can be expressed as item identifiers (1st 2bytes, 2nd bytes, 3rd bytes, 4th bytes) of each stage.

That is, in case that 8 byte of item identifier is divided into 4 fields of 2 byte, the first field has the uppermost item identifier and the next field has an item identifier of the next stage. In the 4-stage hierarchical structure, the last-staged
10 item has an item identifier of which none of 4 fields are '0'.

In this respect, in case that the 4th field is changed to '0', the very upper field becomes an item identifier, while in case that the 3rd and 4th field are all changed to '0', the 2nd field becomes an item identifier.

For example, in the user preference item, the item identifier of the 'new age' is 1-17-181-205, and the 'new age' item signifies that it belongs to the 'pop music' item having 1-17-181-0 as an item identifier.
15

As another example taken, in the user preference item, the 'pop music', having the item identifier of 1-17-181-0, belongs to the 'music' having an item identifier of 1-17-0-0, and the 'music', having the item identifier of 1-17-0-0,
20 belongs to the 'entertainment' having an item identifier of 1-0-0-0.

Meanwhile, the 'entertainment' having the identifier of 1-0-0-0 includes items of every item identifier having the form of 1-*-*-. Especially, the 'entertainment' includes every item having a form of 1-*-0-0 as items at the very lower stage.

25 In this method, the identifier of each item is dependent on the identifier of

the upper item, and items are differentiated by changing an identifier belonging to a field.

Accordingly, each field may start from '0' and a single field can be expressed by 2 bytes, so that a single item can include 65,535 lower items.

5 Figure 8 is a table showing the hierarchical structure of Figure 2 by using a lowermost user preference in accordance with the present invention.

The method as shown in the drawing is advantageous in that since upper items and relevant user preference values can be all extracted by using only the related information of the lowermost item in the hierarchical structure, the user preference value of the upper items can be calculated on a real time basis, and
10 even if the user preference values of the upper items are not stored, there is no information loss. That is, this method does not require much memory.

As mentioned above, like the method for expressing the individual user preference information structure by using the coding scheme, the individual user preference information structure can be also expressed by using the coding
15 scheme with the same effect.

Figure 9 is a table showing a hierarchical structure of Figure 1 by using an item dictionary in accordance with the present invention.

With reference to Figure 9, items are defined by item identifiers to thereby
20 generate an item dictionary, and a structural relationship between the upper items and the lower items is searched by using the item identifiers defined in the item dictionary.

Although the method in which the hierarchical structure is expressed by using the item dictionary has a shortcomings that the item dictionary is to be
25 always referred to confirm that the hierarchical structural relationship between the

user preference items are defined in the item dictionary, the method is advantageous in an aspect that it needs the smallest storing space and an item is easily added or deleted.

Meanwhile, with reference to Figures 6 through 9, in the method for expressing the user preference information, the method for editing the user preference information after inputting information includes a user inputting type, an automatically updating type and a mixed type.

The user inputting type is a method that as the user uses certain information, a user preference/non-preference for the information used by the user is received through a dialog box, thereby updating a user preference.

The automatically updating type is a method that as the user uses certain information, a user preference is automatically updated in consideration of user preference items corresponding to the information used by the user in a predetermined standard.

The mixed type refers to a method mixing the user inputting type and the automatically updating type in which the information inputted by the user has a certain weight value, based on which a user preference is updated.

After the user preference/non-preference is edited through the above methods, in order to search information desired by the user, or recommend and provide information to the user, there are two methods: one method is that each user preference/non-preference is directly compared by user preference items to use, and the other method is that a standardized user preference/non-preference is used.

In order to automatically edit the user preference/non-preference on the basis of the information use record of the user, there is a method that items from

the uppermost one to the lowermost one are all increased according to the classified item of each use information.

Meanwhile, in case that the individual user preference information is edited in the user preference item dictionary, for example, the user preference
5 related to the upper items, such as 'entertainment', 'music', 'pop music', 'person', 'woman singer' to which the items such as a woman singer 'C' and 'new age' belong, can be also updated together by using only the user preference item information of the woman singer 'C' and 'new age'.

Figure 10 is a table showing dictionary items for the user preference
10 items in accordance with the present invention.

With reference to Figure 10, each user preference information is expressed by a set of individual user preference information having user preference/non-preference value by items and expressed by a description indicating an adaptive condition of each individual user preference information, for
15 the whole or partial item dictionary. In this manner, the hierarchical structure of the plurality of user preference items is constructed, edited and managed.

The record of the item dictionary includes a user preference item identifier, a user preference item, a level and an upper item identifier.

The user preference item identifier identifies each user preference item,
20 and the user preference item indicates a content of the information to be provided to the user.

The level indicates the position of each user preference item leveled down from the upper position in the hierarchical structure. The uppermost level is '0'.

The upper item identifier indicates which one of an upper user preference
25 item each user preference item belongs to. In a tree structure, the upper item

identifier has an upper user preference item to which itself belongs.

The item dictionary is produced and managed by an information provider, and may exist in a storing unit of the user.

In case that the storing unit of the user includes the item dictionary, the
5 item dictionary existing in the storing unit of the user must have the same content as that of the information provider. If the content of the item dictionary of the information provider is changed, the item dictionary of the user should be changed accordingly.

For example, in case that the user 'A' prefers a piece of music 'S' of a
10 woman singer 'C' and the piece 'S' is included in the 'new age', the user 'A' preference information related to the woman singer 'S' can be constructed as shown in Figures 6 through 9.

Figures 11A and 11B illustrate a construction in case that information of
the hierarchical data structure is edited, of which Figure 11A illustrates a
15 construction before information having the hierarchical data structure is edited in accordance with the present invention and Figure 11B illustrates a construction after information having the hierarchical data structure is edited in accordance with the present invention.

For example, when the piece 'S' was registered in the user preference
20 information, since there was no music genre of 'new age' (that is, an item), the piece 'S' was classified by 'music>pop music>balade 130(1)-111M'.

However, as a pop music of 'new age' 130(1)-111N appears and comes
on the stage as a new music genre in the music circle, when the piece 'S' is
separated from the 'ballad' to be classified into the 'new age', the user preference
25 can be automatically updated on the user's information use record.

In detail, when the piece 'S' is first classified, the user reduces the user preference value for the piece 'S' in proportion to the number of use in the item of 'music>pop music>ballad' and increases the user preference value as much in the item of 'music>pop music>new age' as newly classified.

5 In the same way, when pieces of music of which classification has been changed are processed, there may be created a user preference on the item of 'music>pop music>new age' newly registered on the basis of the information use record without user's recognition. In this case, the information use record should include the number of use of the information or information making it possible to
10 compute the number of use.

Figures 12A and 12B show a case where the classification for the items registered in the item dictionary is changed, of which Figure 12A is a table showing an item dictionary before it is changed in accordance with the present invention; and Figure 12B is a table showing an item dictionary before it is
15 changed in accordance with the present invention.

The lower items belonging to the items of pop music and classic music are automatically changed from the lower items of 'entertainment>music>pop music>' and 'entertainment>music>classic' to the lower items of 'art>auditory art>pop music' and 'art>auditory art>classic'.

20 The item dictionary changing method may need additional arithmetic operation. For example, in case that each item includes all of the item identifiers of the upper stage, the item identifiers can be changed.

As stated above, in case that the classification of the user preference items is changed, the user preference corresponding to the entertainment item
25 and the music item, that is, the upper items of the pop music item and the classic

item in the preference information by users is reduced in proportion to the user preference generated due to the pop music item and the classic item while the user preference of the newly classified items of the art and the auditory art is proportionally increased.

5 In addition, in case that the user asks the information provider to recommend new information or is connected with the information provider by using the user preference information and the use record, the information provider can recommend information that can be highly preferred by the user.

10 In the method for changing the multiple hierarchical data structure, the user preference/non-preference by items is changed by using the user interface.

As so far described, according to the user preference information structure having a multiple hierarchical structure and a multi-media information providing method using the same, the hierarchical data structure that is able to provide the user preference for providing information desired by the user is provided
15 depending on the environment, based on which various information can be provided.

The hierarchical data structure constructing the user preference makes it possible for the user to receive information fitting the situation in which he or she is put by using a proper individual user preference information, automatically or
20 according to user's selection.

In addition, since the user preference items have the hierarchical structure, various level of user preference items can be defined. And, in case that the upper user preference items rather than the lowermost user preference item are selected, a detailed information can be provided to users by using their lower level of user
25 preference for the information belonging to the selected item classification. Also,

the user preference of the upper level of user preference items can be constructed by using the user preference of the low level of user preference items.

As the present invention may be embodied in several forms without departing from the spirit or essential characteristics thereof, it should also be understood that the above-described embodiments are not limited by any of the details of the foregoing description, unless otherwise specified, but rather should be construed broadly within its spirit and scope as defined in the appended claims, and therefore all changes and modifications that fall within the meets and bounds of the claims, or equivalence of such meets and bounds are therefore intended to be embraced by the appended claims.